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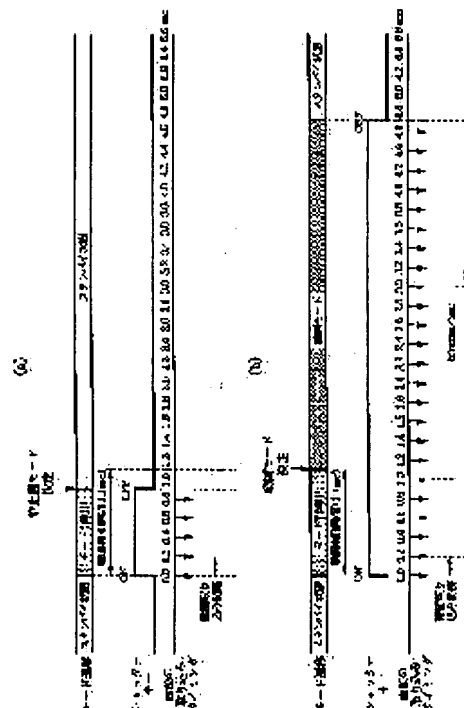
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(54) IMAGE RECORDER

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an image recorder by which a photographer can mainly photograph in a photographing mode desired by the photographer without the need for the photographer to conduct troublesome operations.

SOLUTION: When a shutter key is closed, capturing of an image from a CCD is started and the image capturing is made every 0.2 second and image data of an object is sequentially stored in independent areas of an image memory. A timer to discriminate a mode is started at the same time. When the shutter key is open before a time of the timer reaches a moving picture discrimination time (1.1 second), a still picture mode is decided as the photographing mode and the image captured is first recorded in a form of a still picture (Figure 4(a)). Conversely the shutter key is kept depressed and when the time of the timer exceeds the moving picture discrimination time (1.1 second), a moving picture mode is decided as the photographing mode and a plurality of the image data captured in the image memory is recorded in a form of moving pictures (Figure 4(b)).



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CLAIMS

[Claim(s)]

[Claim 1] In image recording equipment equipped with the still picture mode which records the image data of the photographic subject picturized with the image pick-up means in the data format for still pictures, and the cine mode recorded in the data format for animations the time check which measures the duration of the photography directions actuation by actuation means to perform photography directions actuation of directing the image pick-up of a photographic subject, and this actuation means -- with a means this time check -- the image recording equipment characterized by having the means for switching which switches the record format of the image data of the photographic subject picturized with said image pick-up means from said object for still pictures to said animations in connection with exceeding the time amount the actuation duration measured by the means was decided to be.

[Claim 2] said time check -- the image recording equipment according to claim 1 characterized by having a data generation means to compress serially the image data of the photographic subject picturized by said image pick-up means in connection with exceeding the time amount the actuation duration measured by the means was decided to be, and to generate the image data for said animations.

[Claim 3] A voice input means to input the voice reproduced on the occasion of the display of the image data recorded with photography directions actuation of said actuation means, A record means to record on photography directions actuation of said actuation means with the voice inputted into this voice input means, A detection means to detect the input level of the voice in said voice input means, the time check which measures the time amount in the condition of the detection result of this detection means having continued and having exceeded predetermined level -- with a means while the photography directions actuation by said actuation means is continued -- said time check, only when the time amount measured by the means is beyond predetermined time Image recording equipment according to claim 1 or 2 characterized by having the control means which makes the image of the photographic subject picturized with the photography directions actuation by said actuation means correspond, and makes the voice inputted into said voice input means record on said record means.

[Claim 4] In the image recording equipment which records the image of the photographic subject picturized with the image pick-up means as image data A voice input means to input the voice reproduced on the occasion of the display of the image data recorded with photography directions actuation of an actuation means to perform photography directions actuation of directing the image pick-up of a photographic subject, and this actuation means, A record means to record the voice inputted into this voice input means, and a detection means to detect the input level of the voice in said voice input means, the time check which measures the time amount in the condition of the detection result of this detection means having continued and having exceeded predetermined level -- with a means while the photography directions actuation by said actuation means is continued -- said time check, only when the time amount measured by the means is beyond predetermined time Image recording equipment characterized by having the control means which makes the image of the photographic subject picturized with the photography directions actuation by said actuation means correspond, and makes the voice inputted into said voice input means record on said record means.

[Claim 5] the inside of the time amount by which photography directions actuation according [said control means] to said actuation means is continued -- said time check -- image-recording equipment 3 characterized by to make the image of the photographic subject picturized with the photography directions actuation by said actuation means correspond, and to make the voice currently prepared beforehand record on said record means when the time amount measured by the means does not reach predetermined die length, or given in four.

[Claim 6] Said control means is image recording equipment 3 characterized by superimposing the voice inputted into said voice input means on the image of the photographic subject picturized with the photography directions actuation by said actuation means, and making it record on said record means, 4, or given in five.

[Claim 7] claim 1 characterized by to have an exposure detection means detect the light exposure at the time of the

image pick-up of the photographic subject by said image pick-up means, and for said control means to stop record of said image data accompanying photography directions actuation of said actuation means when the light exposure detected by said exposure detection means has not reached the specified quantity thru/or 6 -- either -- the image-recording equipment of a publication.

[Claim 8] claim 3 characterized by for said control means superimposing the voice inputted into said voice input means on the image prepared beforehand, and making it record it on said record means when the light exposure detected by said exposure detection means has not reached the specified quantity thru/or 7 -- either -- the image recording equipment of a publication.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to control in photography mode in more detail about image recording equipments, such as a digital camera.

[0002]

[Description of the Prior Art] In recent years, the digital camera which compresses the photographic subject image picturized using solid state image sensors, such as CCD, with compression processing techniques, such as JPEG, and is recorded on record media, such as a flash memory, as image data has spread. Moreover, in addition to the still picture mode which records a still picture, in this kind of digital camera, there are a cine mode which records the animation of ream fixed time amount, and a thing equipped with the photography mode with voice which records voice on photography and coincidence of a still picture or an animation further.

[0003]

[Problem(s) to be Solved by the Invention] However, as mentioned above, have a still picture and a cine mode, and it sets to the digital camera which can record an image by the plural formula. Since a photography person needs to set up photography mode beforehand according to the class (a still picture and animation) of image to record, When the moment for a good picture in different photography mode from the photography mode set up in advance visited, just before starting photography, photography mode needed to be changed, and there was a problem of being easy to produce the situation which misses a moment for a good picture.

[0004] Moreover, in what has photography mode with voice, although it was desirable for both voice and an image to be recordable in the best condition, depending on the situation at the time of photography, only one of voice and the images is sometimes recordable frequently in the best condition, and, in such a case, there was a problem that the memory for record was consumed vainly, by recording unnecessary image data and voice data.

[0005] This invention aims at offering the image recording equipment which is made in view of this conventional technical problem, and the photography of with the photography mode which a photography person desires is attained, without making complicated actuation give a photography person, and enables a deployment of the memory for record.

[0006]

[Means for Solving the Problem] If it is in invention of claim 1 in order to solve said technical problem In image recording equipment equipped with the still picture mode which records the image data of the photographic subject picturized with the image pick-up means in the data format for still pictures, and the cine mode recorded in the data format for animations the time check which measures the duration of the photography directions actuation by actuation means to perform photography directions actuation of directing the image pick-up of a photographic subject, and this actuation means -- with a means this time check -- in connection with exceeding the time amount the actuation duration measured by the means was decided to be, it should have the means for switching which switches the record format of the image data of the photographic subject picturized with said image pick-up means from said object for still pictures to said animations

[0007] In this configuration, when the time amount on which the image data of a photographic subject was recorded in the data format for still pictures when not exceeding the time amount the actuation duration in a photography directions means was decided to be, and it decided is exceeded, it is recorded in the data format for animations.

[0008] moreover -- if it is in invention of claim 2 -- said time check -- in connection with exceeding the time amount the actuation duration measured by the means was decided to be, the image data of the photographic subject picturized by said image pick-up means should be compressed serially, and it should have a data generation means to generate the image data for said animations

[0009] In this configuration, since compression of the image data for animation formats is started while photography directions actuation of an actuation means is performed, while photography directions actuation is performed, there is little image data storage capacity which should secure the image data for animations compared with the case where it memorizes according to the individual, and it ends.

[0010] Moreover, a voice input means to input the voice reproduced on the occasion of the display of the image data recorded with photography directions actuation of said actuation means if it is in invention of claim 3, A record means to record on photography directions actuation of said actuation means with the voice inputted into this voice input means, A detection means to detect the input level of the voice in said voice input means, the time check which measures the time amount in the condition of the detection result of this detection means having continued and having exceeded predetermined level -- with a means while the photography directions actuation by said actuation means is continued -- said time check, only when the time amount measured by the means is beyond predetermined time It should have the control means which makes the image of the photographic subject picturized with the photography directions actuation by said actuation means correspond, and makes the voice inputted into said voice input means record on said record means.

[0011] In this configuration, at the time of photography, since voice is recorded only when the condition that the input level of the voice inputted into the voice input means exceeded predetermined level is beyond predetermined time, when it reproduces on the occasion of the display of image data, record of the voice which is not effective can be prevented.

[0012] Moreover, if it is in invention of claim 4, the image of the photographic subject picturized with the image pick-up means is set to the image recording equipment recorded as image data. A voice input means to input the voice reproduced on the occasion of the display of the image data recorded with photography directions actuation of an actuation means to perform photography directions actuation of directing the image pick-up of a photographic subject, and this actuation means, A record means to record the voice inputted into this voice input means, and a detection means to detect the input level of the voice in said voice input means, the time check which measures the time amount in the condition of the detection result of this detection means having continued and having exceeded predetermined level -- with a means while the photography directions actuation by said actuation means is continued -- said time check, only when the time amount measured by the means is beyond predetermined time It should have the control means which makes the image of the photographic subject picturized with the photography directions actuation by said actuation means correspond, and makes the voice inputted into said voice input means record on said record means.

[0013] Also in this configuration, at the time of photography, since voice is recorded only when the condition that the input level of the voice inputted into the voice input means exceeded predetermined level is beyond predetermined time, when it reproduces on the occasion of the display of the recorded image, record of the voice which is not effective can be prevented.

[0014] moreover, the inside of the time amount by which photography directions actuation according [said control means] to said actuation means is continued if it is in invention of claim 5 -- said time check -- when the time amount measured by the means does not reach predetermined die length, make the image of the photographic subject picturized with the photography directions actuation by said actuation means correspond, and the voice currently prepared beforehand makes record on said record means In this configuration, effective voice is recordable with the always photoed image.

[0015] Moreover, if it is in invention of claim 6, said control means superimposes the voice inputted into said voice input means on the image of the photographic subject picturized with the photography directions actuation by said actuation means, and is made to record it on said record means.

[0016] Moreover, if it is in invention of claim 7, it has an exposure detection means to detect the light exposure at the time of the image pick-up of the photographic subject by said image pick-up means, and said control means shall stop record of said image data accompanying photography directions actuation of said actuation means, when the light exposure detected by said exposure detection means has not reached the specified quantity. In this configuration, useless image data is not recorded at the time of photography.

[0017] Moreover, if it is in invention of claim 8, said control means superimposes the voice inputted into said voice input means on the image prepared beforehand, and is made to record it on said record means, when the light exposure detected by said exposure detection means is below a predetermined value. In this configuration, an effective image is always recordable with the voice at the time of photography.

[0018]

[Embodiment of the Invention] (Gestalt of the 1st operation) The gestalt of 1 operation of this invention is hereafter explained according to drawing. Drawing 1 is the block diagram showing the electric configuration of the digital camera

1 which is image recording equipment of this invention.

[0019] The digital camera 1 mainly consists of CCD2, the CCD control section 3, the YUV processor 4, a memory controller 5, an image memory 6, the video encoder 7, the video outlet section 8, a control section 9, a record medium 10, and the key processing section 11.

[0020] CCD2 is driven based on the timing signal made from the CCD control section 3, picturizes the photographic subject image by which image formation was carried out with the lens prepared in the body of a camera which is not illustrated, and outputs it to the CCD control section 3 as a color picture signal (analog). The CCD control section 3 carries out A/D conversion of the inputted color picture signal one by one based on a timing signal, and sends it to the YUV processor 4. The YUV processor 4 creates brightness component data (Y) and two color component data (Cb, Cr) from each pixel of a color picture. While a memory controller 5 stores in order three kinds of image data which the YUV processor 4 created in an image memory 6, when it is in a photography standby condition, it reads Y data in every other line, Cb data, and Cr data from an image memory 6 according to the 1st field and the 2nd field, and sends it to the video encoder 7 one by one.

[0021] The video encoder 7 changes into an RGB code the data sent from the memory controller 5, and sends them to the video outlet section 8. The video outlet section 8 has the liquid crystal module, and the image based on the RGB code sent from the video encoder 7, i.e., the record image with which the through image is memorized by the record medium 10 again at the time of playback of a record image at the time of photography standby, is displayed on a liquid crystal module.

[0022] The control section 9 consists of a CPU, a ROM, RAM, etc. ROM stores various kinds of control programs performed by CPU, the data used at the time of control, and RAM has the work-piece field used in the various processings performed by CPU. CPU controls actuation of a memory controller 5 based on the key input signal sent from the key processing section 11 containing two or more actuation keys, such as said control program and a shutter key arranged by the body of a camera, a power-source key, and a mode change key. Moreover, a control section 9 memorizes the data which changed into the data for still pictures (for example, JPEG format), and the data for animations (for example, MPEG format) the image data read by said memory controller 5, and were changed at the time of the photography by which said shutter key was operated to a record medium 10. A record medium 10 is a flash memory etc.

[0023] Next, actuation concerning this invention of this digital camera 1 is explained. When drawing 2 is in a photography standby condition, the flow chart and drawing 4 which show the key processing which CPU of a control section 9 performs at fixed spacing are a timing chart for explaining actuation of the digital camera 1 corresponding to this processing.

[0024] Hereafter, it explains according to drawing 2. CPU's initiation of key processing actuation distinguishes whether the shutter key is pressed based on the key input signal first sent from the key processing section 11 (step SA 1). It distinguishes further whether when the shutter key is not pressed, the on-flag stands last time (step SA 8), and when the result of this distinction is also NO, processing is ended as it is. On the other hand, it distinguishes further whether it is or not immediately after the shutter key's having been pressed by the photography person, and pressing whether the on-flag stands last time further and a shutter key, when the distinction result of a step SA 1 is YES (step SA 2). Here, if it is immediately after pressing a shutter key, "NEW ON processing" of a step SA 3 - a step SA 6 will be performed. That is, an on-flag is set last time first (step SA 3), and the timer value for animation distinction is cleared (step SA 4). Next, timer-interruption processing is permitted (step SA 5), and it incorporates in the image memory 6 in the size which uses the first image data for one sheet as data for still pictures (step SA 6).

[0025] As said timer-interruption processing is shown in drawing 3 and drawing 4, it is the processing (step SB 1) which incorporates the image data for one sheet of the photography image picturized by CCD2 every 0.2 seconds to an image memory 6, and the incorporated image data is stored in the area according to individual of an image memory 6, without overwriting the last image as data smaller than the size used as data for still pictures for animations.

[0026] Then, even if it is a time of being distinguished when the shutter key was not pressed when the shutter key was pressed and it is distinguished (it is YES at a step SA 2) and If the time amount counted by the timer for animation distinction which the on-flag stands last time (it is YES at a step SA 8), and was mentioned above has not gone through predetermined chattering time amount (it is NO at a step SA 9) Processing which increments the value of the timer for animation distinction as "processing during ON" is performed (step SA 7). That is, while a shutter key is continuing being pressed, "processing during ON" is continued and sequential are recording of the photography image data for animations is carried out in an image memory 6 by performing timer-interruption processing which showed ** to between them at drawing 3 every 0.2 seconds. [starting]

[0027] If it stops a photography person pressing a shutter key after an appropriate time (a step SA 1 is NO and both the

steps SA8 and SA9 are YES), the following "NEW OFF processings" will be performed. That is, an on-flag is cleared last time (step SA 10), and after forbidding the timer-interruption processing shown in drawing 3 (step SA 11), it distinguishes whether the timer value counted by processing during ON is over predetermined animation distinction time amount (the gestalt of this operation 1.1 seconds) (step SA 12). As shown in drawing 4 (a), the time amount by which the photography person was pressing the shutter key is 0.9 seconds here. As it shifts to still picture mode processing if it is not over animation distinction time amount (it is NO at a step SA 12), and shown in drawing 4 (b) The time amount (actuation duration) by which the photography person was pressing the shutter key is 4.7 seconds, and if the timer value for animation distinction is over animation distinction time amount, it will shift to cine-mode processing (being a step SA 12 YES).

[0028] In cine-mode processing, the size of the image data incorporated first is changed into the image memory 6 from still picture size at a step SA 6 at animation size (step SA 13), and the first image data which carried out size conversion, and the remaining image data (the 2nd sheet or subsequent ones) stored in animation size from the start by said timer-interruption processing are recorded on a record medium 10 in an animation format (step SA 14). Moreover, in still picture mode processing, the image data of the still picture size first incorporated to the image memory 6 is recorded on a record medium 10 in a still picture format as it is (step SA 15), and processing is ended.

[0029] Therefore, even if it has not done beforehand the activity which sets up the class (a still picture and animation) of record image, a photography person only adjusts the time amount which presses a shutter key, and can record the image of the class for which it asks. For this reason, when a shutter chance visits, while starting photography immediately, it is possible to record as an animation by using a photographic subject as a still picture by that occasional decision. Moreover, in the gestalt of this operation, since the first image data for one sheet which is a step SA 6 and was incorporated in the image memory 6 in the size for still pictures immediately after pressing a shutter key was used as data for one sheet of the beginning for animations when it shifted to cine-mode processing, only the field which is equivalent to one frame in the memory area of the image data for animations can be saved.

[0030] (Gestalt of the 2nd operation) Next, the gestalt of operation of the 2nd of this invention is explained. In the digital camera 1 shown in drawing 1, the gestalt of this operation is related, when it has the processing engine performance in which CPU of said control section 9 is comparatively high. Drawing 5 is a flow chart which shows other key processings which CPU of a control section 9 performs at fixed spacing. Hereafter, according to this drawing, actuation of the digital camera 1 in the gestalt of this operation is explained.

[0031] If CPU starts key processing actuation also in the gestalt of this operation, based on the key input signal first sent from the key processing section 11, it will distinguish whether the shutter key is pressed (step SC 1). the time of a shutter key not being pressed and the on-flag not standing last time -- (-- a step SC 1 and a step SC 11 -- both -- NO) -- processing is ended as it is. On the other hand, immediately after the shutter key was pressed by the photography person, YES and a step SC 2 perform [(step SC1) NO) and "NEW ON processing" of a step SC 3 - a step SC 6. That is, an on-flag is set last time first (step SC 3), and the timer value for animation distinction is cleared (step SC 4). Next, the timer-interruption processing in every 0.2 seconds mentioned later is permitted (step SC 5), and it incorporates in the image memory 6 in the size which uses the first image data for one sheet as data for still pictures (step SC 6).

[0032] Then, even if it is a time of being distinguished when the shutter key was not pressed if the shutter key is pressed while being distinguished (it is YES at a step SC 2) and the time amount which the on-flag stands last time (it is YES at a step SC 11), and has been counted by the timer for animation distinction has not gone through predetermined chattering time amount -- if it kicks (it is NO at a step SC 12), it will perform "processing during ON". [of the following] After incrementing said timer value first in "processing during ON" (step SC 7), it distinguishes whether it is over predetermined animation distinction time amount (it also sets in the gestalt of this operation and is 1.1 seconds) (step SC 8). While the result of this distinction is NO, timer-interruption processing permitted at the step SC 5 mentioned above is performed. As spacing of interrupt processing is every 0.2 seconds also in the gestalt of this operation and it is shown in drawing 6 When said timer value is not over said animation distinction time amount at the time of an interrupt, by (step SD1 NO), It stores in the area according to individual of an image memory 6, without overwriting the last image as data smaller than the size which uses the image data for one sheet of the photography image picturized by CCD2 as data for still pictures for animations (step SD 2). Therefore, sequential are recording of the photography image data for animations is carried out every 0.2 seconds in an image memory 6 until the duration exceeds animation distinction time amount, while continuing being pushed in a shutter key. In addition, actuation of this time is substantially [as the case of the gestalt of the 1st operation] the same.

[0033] Moreover, if the time amount on which the shutter key is pushed exceeds animation distinction time amount on the occasion of activation of "processing during ON" and the distinction result of a step SC 8 is set to YES First, the size of the image data first incorporated in the image memory 6 is changed into animation size from still picture size at a

step SC 6 (step SC 9). Next, the remaining image data (the 2nd sheet or subsequent ones) stored in animation size from the start by said timer-interruption processing is recorded on the image memory 6 in a compression animation format, for example, an MPEG format, (step SC 10). In addition, about processing of this step SC 9 and a step SC 10, although not clearly written in the illustrated flow chart, after newly performing "NEW ON processing" mentioned above, it shall carry out only once. And the distinction result of the step SD 1 kicked to the timer-interruption processing of drawing 6 performed every 0.2 seconds when a shutter key continues being pressed by this or subsequent ones serves as YES, and animation record on the real time which adds serially the new image data for one sheet of the photography image picturized by CCD2 to the compressed data currently beforehand recorded on the image memory 6 in the compression animation format, that is, updates compressed data is performed (step SC 10).

[0034] If it stops a photography person pressing a shutter key after an appropriate time (a step SC 1 is NO and both the steps SC11 and SA12 are YES), the following "NEW OFF processings" will be performed. That is, after clearing an on-flag last time (step SC 13) and forbidding timer-interruption processing of drawing 6 (step SC 14), it distinguishes whether the timer value counted by "processing during ON" is over animation distinction time amount (1.1 seconds) (step SC 15). Here, if the timer value (actuation duration), i.e., the time amount by which the photography person was pressing the shutter key, is over animation distinction time amount, it will shift to cine-mode processing (it is YES at a step SC 15), and if the time amount by which the photography person was pressing the shutter key is not over animation distinction time amount, it shifts to still picture mode processing (being a step SC 15 NO).

[0035] In cine-mode processing, while generating predetermined animation header data, the compressed data by which compression record was serially carried out by timer-interruption processing of drawing 6 is read, the animation header data generated to it are added, and it records on a record medium 10 (step SC 16). Moreover, in still picture mode processing, the image data of the still picture size first incorporated to the image memory 6 is recorded on a record medium 10 in a still picture format as it is like the gestalt of the 1st operation (step SC 17), and processing is ended.

[0036] Therefore, also in the gestalt of this operation, like the gestalt of the 1st operation, even if it has not done beforehand the activity which sets up the class (a still picture and animation) of record image, a photography person only adjusts the time amount which presses a shutter key, and can record the image of the class for which it asks. and after the time amount on which the shutter key was pushed exceeds animation distinction time amount in the gestalt of this operation In order to compress serially all the image data that constitutes the animation acquired by the time the shutter key was detached, to consider as a video data and to make the same memory area of an image memory 6 memorize, Like the gestalt of the 1st operation, the memory area which should be secured in an image memory 6 becomes less than the case where all the image data that constitutes an animation is left according to the individual on the image memory 6. Therefore, it is possible to record the animation covering a long time more, without increasing the capacity of an image memory 6 compared with the gestalt of the 1st operation.

[0037] In addition, although the gestalt of this operation explained the case where CPU of a control section 9 generated the compression video data in real time, it is good also as a configuration which prepared the circuit and processor of dedication for generating not only this but a compression video data. Moreover, in the gestalt of the 1st and the 2nd operation, although spacing of the timer-interruption processing which the image data for animations incorporates was made into 0.2 seconds and animation distinction time amount was made into 1.1 seconds, the time amount of arbitration can be set to such time amount.

[0038] (Gestalt of the 3rd operation) Next, the gestalt of operation of the 3rd of this invention is explained. The gestalt of this operation is related with the digital camera equipped with the photography mode with voice which records voice on photography and coincidence of a still picture or an animation.

[0039] Drawing 7 is the block diagram showing the electric configuration of the digital camera 21 concerning the gestalt of this operation. In addition to the still picture and the animation, audio record is possible for this digital camera 21, and it has the voice input section 22, the A/D-conversion section 23, the voice level detecting element 24, the D/A transducer 25, and the voice output section 26. The voice input section 22 outputs it as a sound signal while it has the microphone arranged at the body of a camera which is not illustrated and collects the sounds of the perimeter of the body of a camera. The A/D-conversion section 23 changes the output signal of the voice input section 22 into a digital signal, and outputs it to the voice level detecting element 24 as voice data. In addition, the sampling frequency of the voice data in the gestalt of this operation is 20kHz. The voice level detecting element 24 is constituted by the circuit sent to a control section 9 by making the detection result into voice level information while it detects the level of the voice changed into the digital signal.

[0040] The voice data inputted into the voice level detecting element 24 is stored temporarily by the memory controller 5 in an image memory 6, after that, is multiplexed with the image data incorporated by the control section 9 from CCD2, and is recorded on a storage 10. A control section 9 separates the voice data multiplexed by image data while

reading image data from a storage 10 if needed. The D/A transducer 25 changes into a sound signal (analog signal) the voice data separated by the control section 9, and outputs it to the voice output section 26. The voice output section 26 has the amplifier which amplifies the inputted sound signal, the loudspeaker which changes and carries out sound emission of the sound signal after magnification to voice. In addition, about except [this], explanation is omitted by giving the same sign to the same part for being the same as that of the digital camera 1 of drawing 1.

[0041] Next, actuation concerning this invention of this digital camera 21 is explained. When drawing 8 is in a photography standby condition, CPU of a control section 9 is the flow chart which shows the key processing performed at fixed spacing, and drawing 10 and drawing 11 are the timing charts for explaining actuation of the digital camera 21 corresponding to the key processing. In addition, also in key processing of the gestalt of this operation, like the gestalt of the 1st operation, CPU of a control section 9 performs cine-mode processing, when it is judged that the time amount on which the shutter key was pushed was over predetermined animation distinction time amount (the gestalt of this operation 3.1 seconds), and when it is judged that it is not over animation distinction time amount, it performs still picture mode processing.

[0042] the time of distinguishing whether the shutter key is pressed (step SE 1), and a shutter key not being pressed with initiation of key processing actuation, here, and CPU not standing last time hereafter, as for the on-flag, if it explains according to drawing 8 -- (-- a step SE 1 and a step SE 12 -- both -- NO) -- processing is ended as it is. Immediately after on the other hand, pressing a shutter key, when the shutter key is pressed by the photography person and the on-flag does not stand last time (it is NO at YES and a step SE 2 in a step SE 1) that is, "NEW ON processing" of a step SE 3 - a step SE 10 is performed. By this processing, after setting an on-flag last time first and clearing the timer value for animation distinction like the gestalt of the 1st operation, while permitting the timer-interruption processing in every 0.2 seconds which carried out the existing theory by drawing 3, the first image data for one sheet is incorporated in the image memory 6 in the size used as data for still pictures (a step SE 3 - a step SE 6).

[0043] Then, while CPU permits the voice interruption processing (it mentions later for details) in every 50 microseconds and starts incorporation (sound recording actuation) of the voice by the voice input section 22 (step SE 7) After incorporating the first voice data to the predetermined voice storage area currently beforehand assigned to the image memory 6 (step SE 8), a voice multiplex flag is cleared (step SE 9), and a level continuation flag is cleared further (step SE 10). As [showed / in drawing 10 and drawing 11 / the voice multiplex flag and the level continuation flag] It is a thing reflecting change of the level condition of the voice inputted into the microphone of the voice input section 22. A level continuation flag The flag and voice multiplex flag which are set when the level of said voice turns into more than the predetermined level shown in drawing 10 and drawing 11 with the broken line It is the flag set when the level of said voice exceeds said predetermined level and the condition continues exceeding fixed voice multiplex decision time (the gestalt of this operation 0.4 seconds).

[0044] Moreover, even if it is a time of being distinguished when the shutter key was not pressed if the shutter key is pressed after the above "NEW ON processing" while being distinguished (it is YES at a step SE 2) and If the time amount which the on-flag stands last time (it is YES at a step SE 12), and has been counted by the timer for animation distinction has not gone through predetermined chattering time amount (it is NO at a step SF 13) Processing which increments the value of the timer for animation distinction as "processing during ON" is performed (step SE 11). That is, while a shutter key is continuing being pressed, voice data is incorporated every 50 microseconds by voice interruption processing which incorporated image data every 0.2 seconds by timer-interruption processing permitted at the starting step SE 5 which "processing during ON" was continued and mentioned ** above in the meantime, and was permitted at a step SE 7.

[0045] It distinguishes whether after drawing 9 is a flow chart which shows the actuation in said voice interruption processing and stores temporarily the voice data which inputted into the voice input section 22 first, and was changed in the A/D-conversion section 23 on the occasion of voice interruption processing at the predetermined voice storage area on an image memory 6 (step SF 1), the voice multiplex flag mentioned above stands (step SF 2). It distinguishes whether the voice level (level of the voice incorporated at a step SF 1) which the result of this distinction is NO and was succeedingly detected by the voice level detecting element 24 immediately after "NEW ON processing" mentioned above is more than predetermined level (step SF 3). If it is not more than predetermined level here (it is NO at a step SF 3), a level continuation flag will be cleared or processing will be ended with a cleared condition (step SF 10).

[0046] Moreover, if audio level is more than predetermined level (it is YES at a step SF 3) and the level continuation flag does not stand at the time of interruption (it is NO at a step SF 4), after setting a level continuation flag (step SF 5), the value of a voice level judging timer is cleared (step SF 6). Then, while the level continuation flag stands and incrementing the value of a voice level judging timer at the time of interruption (step SF 7) (it is YES at a step SF 4), when it distinguishes whether the timer value exceeded 0.4 seconds (step SF 8) and it is exceeded, a voice multiplex

flag is set (step SF 9). And the distinction result of a step SF 2 serves as YES at the time of interruption once setting a voice multiplex flag, and only the processing (step SF 1) which stores the incorporated voice data temporarily serially at the voice storage area on an image memory 6 is repeated, and is performed.

[0047] If it stops a photography person pressing a shutter key while return and "processing during ON" are again continued by drawing 8 (a step SE 1 is NO and both the steps SE12 and SE13 are YES), the following "NEW OFF processings" will be performed. That is, after clearing an on-flag last time (step SE 14), forbidding timer-interruption processing of drawing 3 (step SE 15) and forbidding voice interruption processing of drawing 9 (step SE 16), it distinguishes whether the timer value counted by "processing during ON" is over animation distinction time amount (3.1 seconds) (step SE 17). Here, if a timer value (actuation duration), i.e., the time amount by which the photography person was pressing the shutter key, is not over animation distinction time amount, as shown in drawing 10, it shifts to still picture mode processing (it is NO at a step SE 17), and if the time amount by which the photography person was pressing the shutter key is over animation distinction time amount, as shown in drawing 11, it will shift to cine-mode processing (being a step SE 17 YES).

[0048] In cine-mode processing, the size of the image data incorporated first is changed into the image memory 6 from still picture size at a step SE 6 at animation size (step SE 18), and the first image data which carried out size conversion, and the remaining image data (the 2nd sheet or subsequent ones) stored in animation size from the start by said timer-interruption processing are once recorded on the predetermined field of the image memory 6 in an animation format (step SE 19). Moreover, in still picture mode processing, the image data of the still picture size first incorporated to the image memory 6 is once recorded on the predetermined field of the image memory 6 in a still picture format as it is (step SE 20).

[0049] Furthermore, after recording image data in the form of either, it distinguishes whether the voice multiplex flag stands succeedingly (step SE 21). When the voice multiplex flag stands (i.e., when the voice more than predetermined value level exceeded 0.4 seconds and has continued and inputted, while the shutter key was pressed), by (step SE21 here YES), While reading the voice data memorized by the voice storage area of an image memory 6, it multiplexes to the image data which once recorded it in the still picture format or the animation format, and records on the record means 10 in a final image format with voice (step SE 22). On the contrary, in not fulfilling the above-mentioned conditions, the data once recorded on the predetermined field of an image memory 6 are recorded on the record means 10 as it is, and it ends processing.

[0050] Therefore, also in the gestalt of this operation, a photography person only adjusts the time amount which presses a shutter key, and can perform photography by still picture mode, and photography by the cine mode. Furthermore, even if a photography person does not choose before photoing two kinds of image recording formats without voice and voice, in the situation of having been suitable for photography with voice, he can photo a still picture or an animation with voice, and can photo a still picture or an animation without voice in the situation of having been suitable for the photography conversely without voice. The frequency which misses a moment for a good picture also by this can be reduced. And since it is automatically recorded in a voice-less image format when not fulfilling the conditions which the audio input level mentioned above, for example, when the sound at the time of photography is too small and the contents of sound recording cannot be caught at the time of playback, useless voice data can be omitted and the record size of image data can be stopped. Consequently, the storage capacity of the data in the record means 10 can be used effectively.

[0051] In addition, although voice data while preparing a voice storage area in a part of image memory 6 and pressing the shutter key there was memorized, the memory for voice is prepared independently [an image memory 6], and you may make it store voice data temporarily in the gestalt of this operation at it. Moreover, you may be the configuration that voice data is not multiplexed by image data, but makes the part and the memory for voice prepared independently of an image memory 6 correspond to image data, and is recorded. Moreover, with the gestalt of this operation, although voice multiplex decision time was made [animation incorporation spacing / voice incorporation spacing] into 0.4 seconds for animation distinction time amount for 3.1 seconds for 50 microseconds for 0.2 seconds, the time amount of arbitration can be set to such time amount.

[0052] Moreover, it can be the following. for example, make default voice data (1 or plurality), such as musical-sound data which formed separately the voice ROM which memorizes voice data, and were prepared there in advance, memorize, or While memorizing the above-mentioned default voice data in record means 10 grade When the distinction result of the step SE 21 of the key processing mentioned above is NO and the voice multiplex flag does not stand The default voice data memorized by said voice ROM etc. can be multiplexed to image data, and it can consider as the configuration finally recorded on the record means 10 in an image format with voice. In that case, an always effective still picture or an always effective animation with voice is recordable. Furthermore, if the photography person enables it

to set up the existence of use of the above-mentioned default voice data in advance, user-friendliness will improve. moreover, the voice which the user recorded by predetermined sound recording actuation using the microphone of said voice input section 22 when the field which memorize default voice data for a part of record means 10 be prepared -- or the configuration on which the audio data inputted from the outside can be make to record as default voice data by predetermined setting actuation (updating) -- then, user-friendliness improve further.

[0053] (Gestalt of the 4th operation) Next, the gestalt of operation of the 4th of this invention is explained. The gestalt of this operation is also related with the digital camera equipped with the photography mode with voice which records voice on photography and coincidence of a still picture or an animation like the gestalt of the 3rd operation.

[0054] Drawing 12 is the block diagram showing the electric configuration of the digital camera 31 concerning the gestalt of this operation. If a different part from the digital camera 21 (drawing 7) of the gestalt of the 3rd operation is explained hereafter, while the voice level detecting element 24 mentioned above in the digital camera 31 will be abolished, the light exposure judging hand part 32 is formed. The light exposure judging hand part 32 is constituted by the circuit sent to a control section 9 by making the judgment result into exposure information while it judges whether photography was performed with light exposure suitable at the time of photography based on the image data sent from the memory controller 5. In addition, about except [this], explanation is omitted by giving the same sign to the same part for being the same as that of the digital camera 21 of drawing 7. Moreover, when it has the processing engine performance in which CPU of a control section 9 is comparatively high, said light exposure judging hand part 32 can be lost, and it can consider as the configuration which acquires said exposure information uniquely by the control-section 9 side.

[0055] Next, actuation concerning this invention of this digital camera 31 is explained. Drawing 13 is a flow chart which shows the key processing which CPU of a control section 9 performs at fixed spacing, when it is in a photography standby condition. In addition, also in key processing of the gestalt of this operation, like the gestalt of the 3rd operation, CPU of a control section 9 performs cine-mode processing, when it is judged that the time amount on which the shutter key was pushed was over predetermined animation distinction time amount (3.1 seconds), and when it is judged that it is not over said animation distinction time amount, it performs still picture mode processing.

[0056] That is, like the gestalt of operation mentioned above, YES is performed at the (step SG1 and CPU of a control section 9 performs NO) and "NEW ON processing" at step SG2, immediately after the shutter key was pressed by the photography person. In this processing, after setting an on-flag last time first (step SG3) and clearing the timer value for animation distinction (step SG4), based on the exposure information from the light exposure judging hand part 32, it distinguishes whether light exposure is suitable (step SG5). Here, it progresses to step SG8, after incorporating the first image data for one sheet in the image memory 6 in the size used as data for still pictures (step SG7), while permitting the timer-interruption processing in every 0.2 seconds which carried out the existing theory by drawing 3 as it was (step SG6), if light exposure is suitable. on the contrary -- for example, -- the case where exposure ran short sharply and is judged as light exposure not being suitable -- (-- step SG5 -- NO) -- it progresses to step SG8 immediately.

[0057] After an appropriate time, the voice interruption processing in every 50 microseconds is permitted, and incorporation (sound recording actuation) of the voice by the voice input section 22 is started (step SG8). In addition, the voice interruption processing in the gestalt of this operation is only processing (processing of the step SF 1 of drawing 9) which stores temporarily serially the voice data which unlike the gestalt of the 3rd operation inputted into the voice input section 22 and was changed in the A/D-conversion section 23 at the predetermined voice storage area on an image memory 6. Then, "NEW ON processing" is ended after incorporating the first voice data to the predetermined voice storage area currently beforehand assigned to the image memory 6 (step SG9).

[0058] Moreover, after the above "NEW ON processing", while performing "processing during ON" (step SG10) and continuing pressing a shutter key in the same procedure as the gestalt of the 3rd operation, it continues "processing during ON". [of incrementing the value of the timer for animation distinction] [starting] In the meantime, under the situation that the distinction result of step SG5 mentioned above was YES, in in the meantime, image data is incorporated every 0.2 seconds, and voice data is incorporated every 50 microseconds. Conversely, under the situation that the distinction result of step SG5 was NO, only incorporation of the voice data in every 50 microseconds is performed.

[0059] Then, if it stops a photography person pressing a shutter key while "processing during ON" is continued (step SG1 is NO and both the steps SG11 and SE12 are YES), "NEW OFF processing" of steps SG13-SG22 will be performed. First, when the image incorporation from CCD2 is being performed after clearing an on-flag last time (step SG13), When the timer-interruption processing in every 0.2 seconds is permitted, at the (step SG14 That is, YES), Timer-interruption processing is forbidden first (image incorporation is ended) (step SG15), and it distinguishes whether the timer value counted by "processing during ON" is over animation distinction time amount (3.1 seconds) (step

SG16). And according to the result of this distinction, it shifts to still picture mode and a cine mode like the gestalt of the 3rd operation, respectively, image data is once recorded on the predetermined field of an image memory 6 in the form of either a still picture or an animation (steps SG17-SG19), and it progresses to step SG21.

[0060] On the other hand, the distinction result of step SG14 is NO, when the timer-interruption processing in every 0.2 seconds is not permitted, without processing steps SG15-SG19, as it is, it progresses to step SG21 and voice interruption processing in every 50 microseconds is forbidden (incorporation of voice data is ended). While reading the voice data memorized by the voice storage area of an image memory 6 after an appropriate time, it is recorded on the record means 10 (step SG22), and processing is ended. Said voice data records it independently, if the image data of the format of either a still picture or an animation is recorded on the image memory 6 at this time, it records in the condition of having multiplexed to that image data and the above-mentioned image data is not recorded.

[0061] Therefore, also in the gestalt of this operation, a photography person only adjusts the time amount which presses a shutter key, and can perform photography by still picture mode, and photography by the cine mode. Furthermore, where photography mode with voice is chosen, since only voice is automatically recorded when an image is not captured with suitable light exposure, for example, when light exposure runs short greatly and an image cannot be deciphered at the time of playback, record of useless image data can be omitted and the record size of data can be stopped. Consequently, the storage capacity of the data in the record means 10 can be used effectively.

[0062] In addition, although voice data while preparing a voice storage area in a part of image memory 6 and pressing the shutter key there like the gestalt of the 3rd operation was memorized, an image memory 6 prepares the memory for voice independently, and you may make it store voice data temporarily also in the gestalt of this operation at it. Moreover, you may be the configuration that voice data is not multiplexed by image data, but makes the part and the memory for voice prepared independently of an image memory 6 correspond to image data, and is recorded. Moreover, the same is said of each setup time, such as animation incorporation spacing.

[0063] Moreover, it can be the following. for example, default image data (still picture data --), such as natural drawing which formed separately the image ROM which memorizes image data, and was prepared there in advance, and a pattern image of the other arbitration any of a video data are sufficient, and it does not matter even if it is plurality. While making it memorize or memorizing the above-mentioned default image data in record means 10 grade When the distinction result of step SG14 of the key processing mentioned above is NO and the timer-interruption processing in every 0.2 seconds is not permitted The default image data memorized by said image ROM etc. is read, and it can replace with the image data which picturized it, can memorize to an image memory 6, and can consider as the configuration which voice data is made to multiplex or correspond to the default image data, and is recorded on the record means 10. In that case, voice is recordable with an always effective image. Furthermore, if the photography person enables it to set up the existence of use of the above-mentioned default image data in advance, user-friendliness will improve. Moreover, when preparing the field which memorizes default image data for a part of record means 10, the configuration on which a user can make the data of the image of the arbitration chosen from the images which are photoed by beforehand [the image or beforehand] which were photoed and are recorded on them record as default image data by predetermined setting actuation (updating), then the one layer user-friendliness of twists improve.

[0064]

[Effect of the Invention] When the time amount on which the image data of a photographic subject was recorded in the data format for still pictures when not exceeding the time amount the actuation duration in a photography directions means was decided to be in this invention, as explained above, and it decided was exceeded, it was made to be recorded in the data format for animations. Therefore, a photography person only adjusts the time amount which presses a shutter key, and can perform photography by still picture mode, and photography by the cine mode, and the photography of him with the photography mode which a photography person desires is attained, without making complicated actuation give a photography person.

[0065] Moreover, while photography directions actuation of an actuation means was performed, compression of the image data for animation formats was made to start, and there is little image data storage capacity which should be secured, and it was made to end. Therefore, it becomes more recordable [the animation covering long duration].

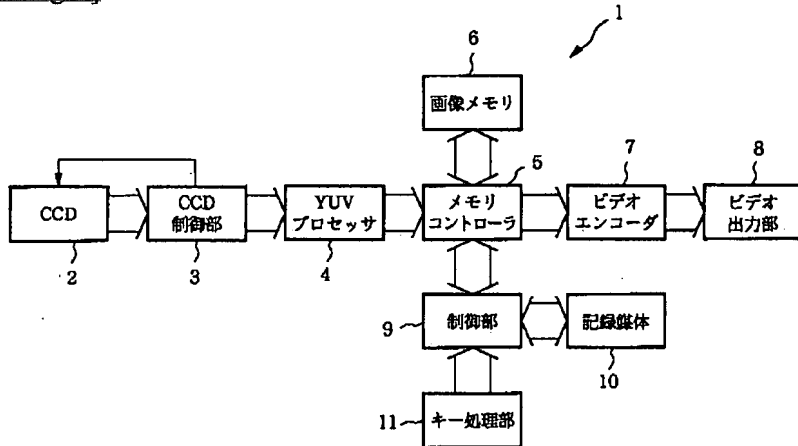
[0066] Moreover, when it reproduces on the occasion of the display of the recorded image at the time of photography of a photographic subject, the memory for record by recording unnecessary voice data loses useless consumption, and the deployment of the memory for record of it is attained from the ability of record of the voice which is not effective to be prevented. Moreover, according to the situation at the time of photography, effective voice can be recorded with the always photoed image, or an effective image can always be recorded with the voice at the time of photography.

[Translation done.]

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

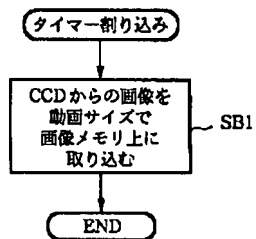
[Drawing 1]



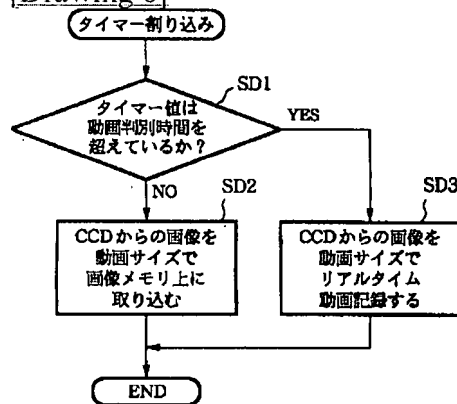
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graph TD
    Start([キー処理]) --> SA1{シャッターキーは押されているか?}
    SA1 -- NO --> SA8{前回ONフラグが立っているか?}
    SA1 -- YES --> SA2{前回ONフラグが立っているか?}
    SA8 -- NO --> SA1
    SA8 -- YES --> SA9{チャタリング時間が経過したか?}
    SA2 -- NO --> SA3[前回ONフラグをセットする]
    SA2 -- YES --> SA4[ON中処理]
    SA3 --> SA4
    SA4 --> SA7[動画半秒間タイマー値をインクリメントする]
    SA7 --> SA5[CCDから画像の取り込みを開始する  
(タイマ満足の許可)]
    SA5 --> SA6[最初の画像を静止画サイズで  
画像メモリ上に取り込む]
    SA6 --> SA1
    SA9 -- YES --> SA10[前回ONフラグをクリアする]
    SA9 -- NO --> SA4
    SA10 --> SA11[CCDから画像の取り込みを終了する  
(タイマ満足の禁止)]
    SA11 --> SA12{タイマー値は動画半秒間を超えているか?}
    SA12 -- YES --> SA13[画像メモリ上の最初の画像を動画サイズに交換する]
    SA13 --> SA14[画像メモリ上の複数の画像を動画形式で記録する]
    SA14 --> SA1
    SA12 -- NO --> SA15[画像メモリ上の最初の画像を静止画形式で記録する]
    SA15 --> SA1
    
```

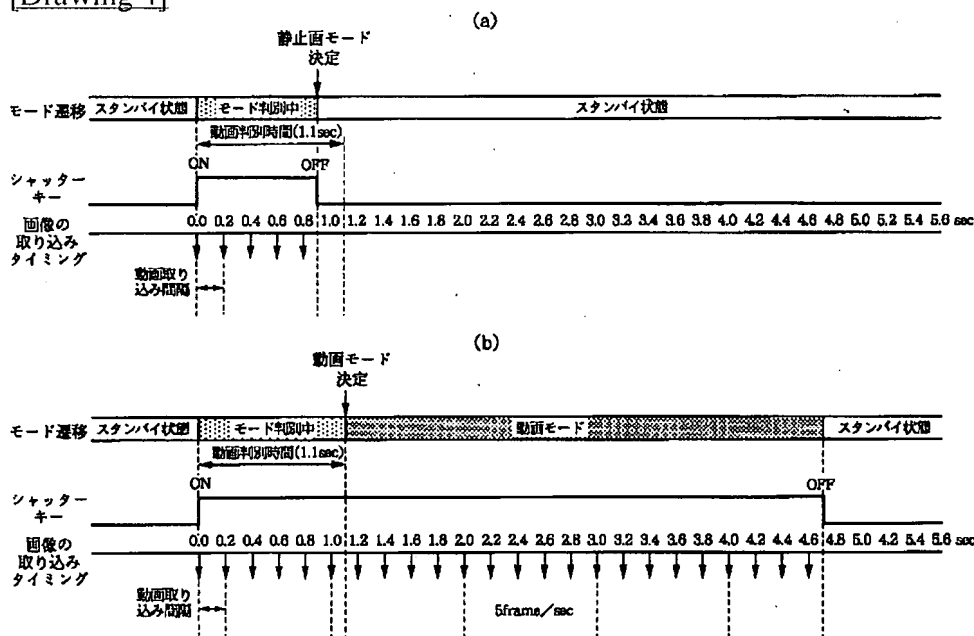
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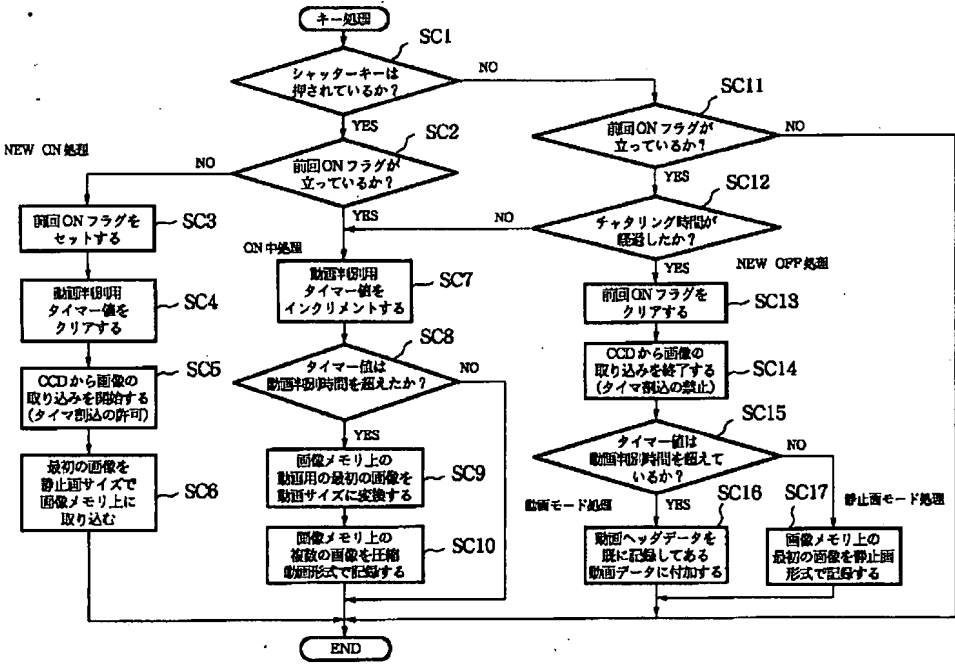
[Drawing 6]



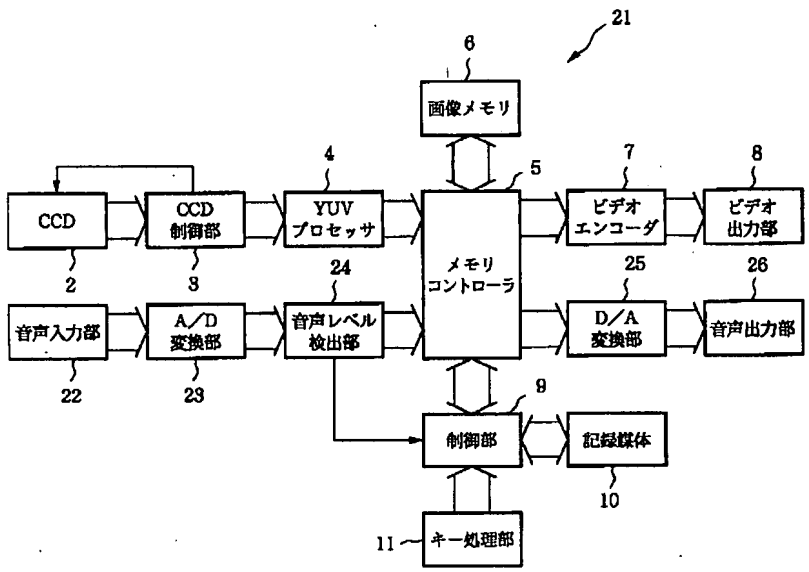
[Drawing 4]



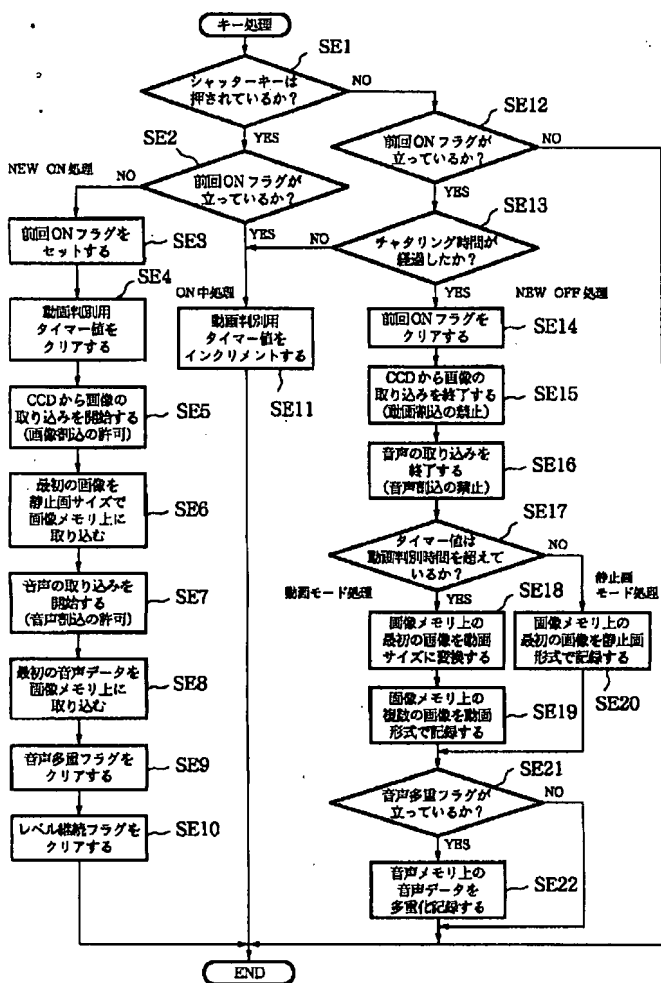
[Drawing 5]



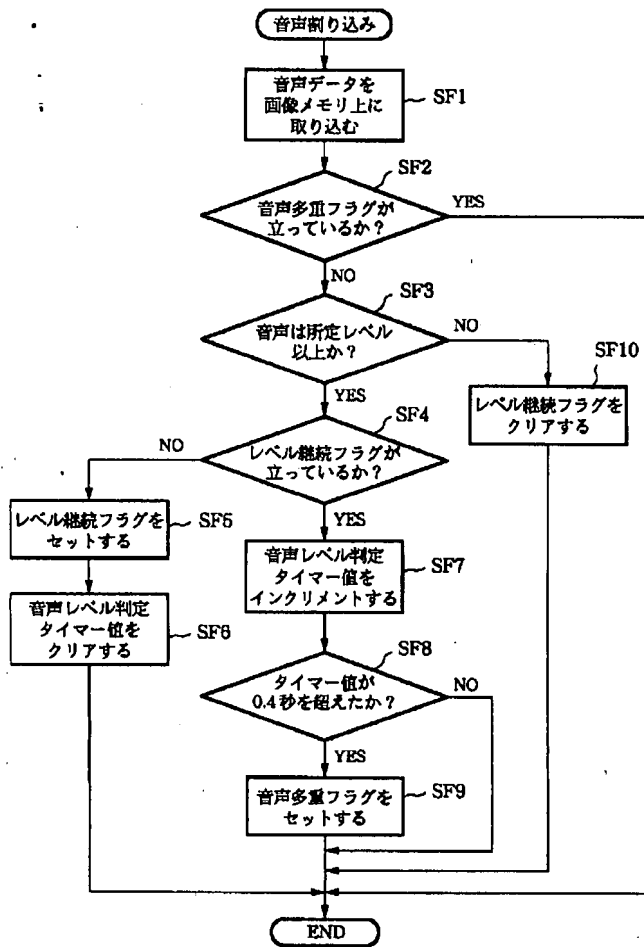
[Drawing 7]



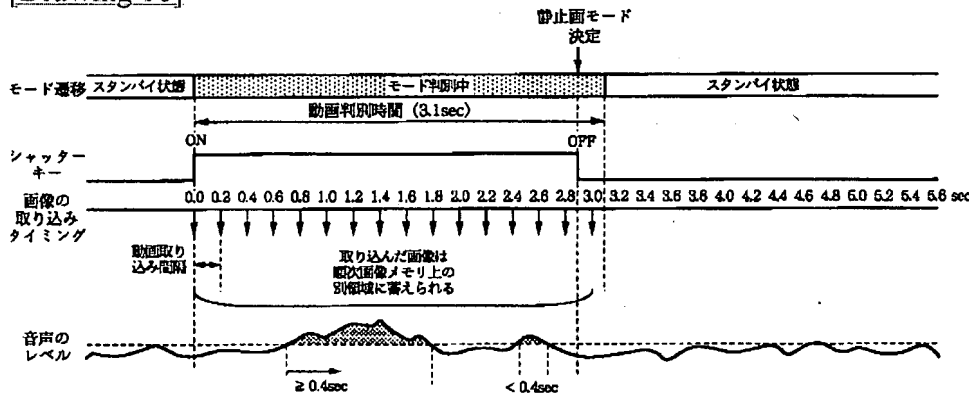
[Drawing 8]



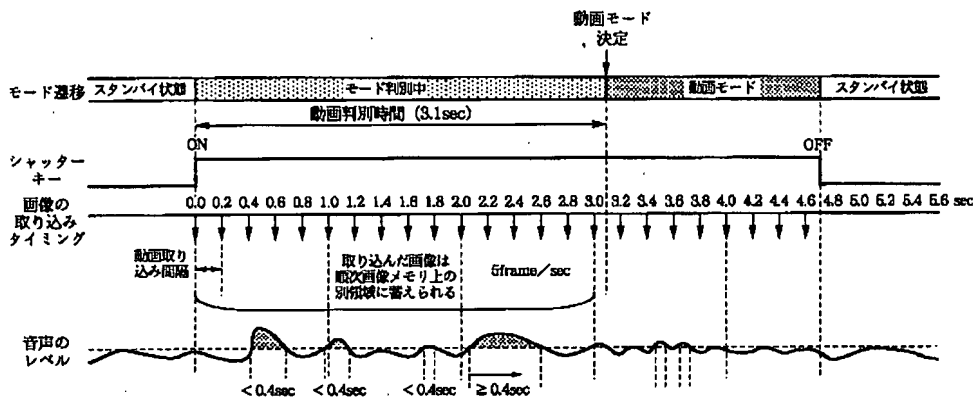
[Drawing 9]



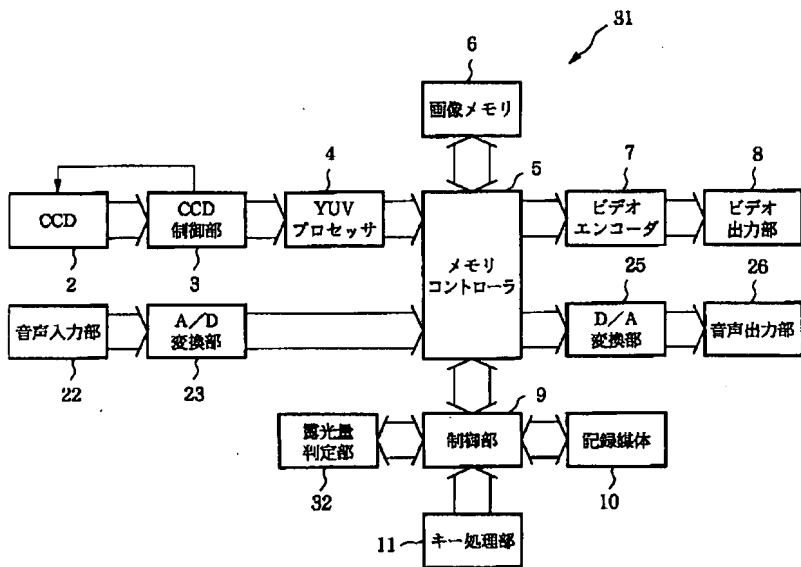
[Drawing 10]



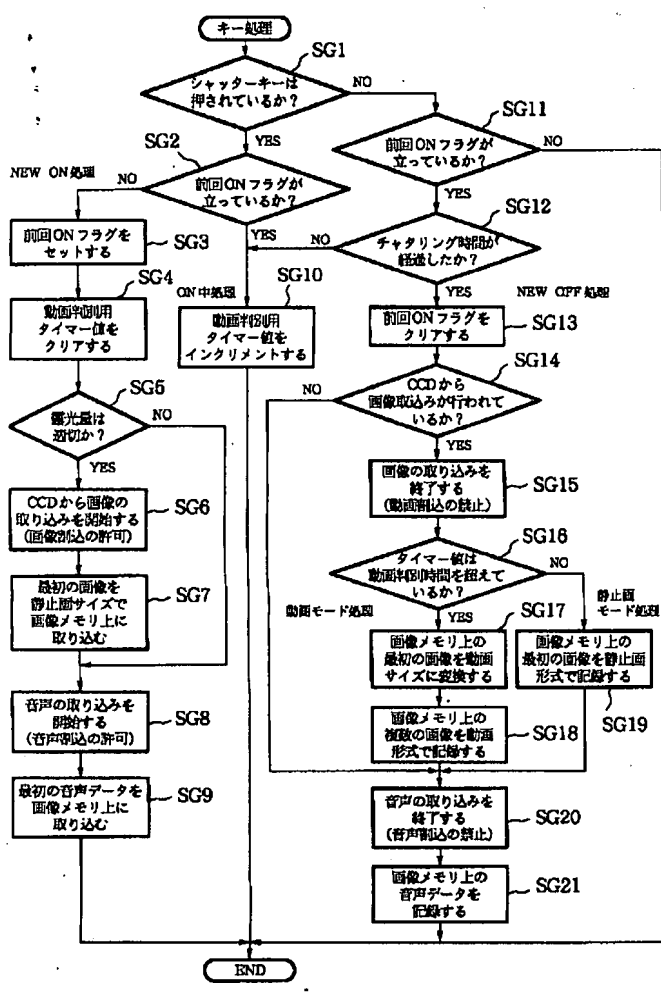
[Drawing 11]



[Drawing 12]



[Drawing 13]



[Translation done.]